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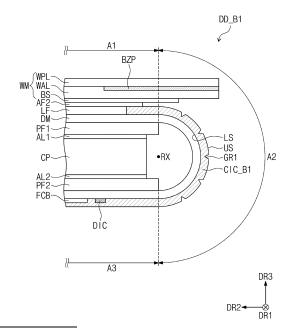
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(54) **DISPLAY DEVICE**

(57) A display device includes a display module, a flexible circuit film, and a cover film. The display module is divided into a first area including pixels, a second area bent with respect to an imaginary axis extending in a first direction, and a third area, on which a driving chip connected to the pixels is disposed. The flexible circuit film is disposed at at least a portion of the third area of the display module and connected to the display module. The cover film covers the second area of the display module, at least a portion of the flexible circuit film, and an entirety of the driving chip.

FIG. 6A



DOCUMENTS CONSIDERED TO BE RELEVANT



EUROPEAN SEARCH REPORT

Application Number

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Category	Citation of document with indication of relevant passages	n, where appropriate,	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
x	US 2021/104695 A1 (JUNG 8 April 2021 (2021-04-08 * paragraph [0056] - par * paragraph [0122] - par * figures 1, 2, 4-6 *	3) cagraph [0084] *	1-37	INV. G06F1/16 H05K1/11 H10K77/10
A	US 2020/381671 A1 (CHA F 3 December 2020 (2020-12 * paragraph [0064] - par * paragraph [0092] - par * paragraph [0126] - par * figures 6A, 6B *	2-03) ragraph [0068] * ragraph [0097] *	1-19	
x	US 2019/318689 A1 (KIM S 17 October 2019 (2019-10 * paragraph [0041] - par * figures 1-3 *)–17)	1-37	
A	US 2017/294495 A1 (SHYU		20-37	
	AL) 12 October 2017 (201 * paragraph [0036] - par * figures 8-17 *	•		TECHNICAL FIELDS SEARCHED (IPC)
A	US 2020/185641 A1 (JEONG AL) 11 June 2020 (2020-0 * paragraph [0079] - par * figures 5-11 *	06-11)	20-37	G06F H01L H05K G02F
	The present search report has been dra	·		
	Place of search	Date of completion of the search		Examiner
X : part Y : part doci A : tech O : non	ATEGORY OF CITED DOCUMENTS icularly relevant if taken alone icularly relevant if combined with another ument of the same category unological backgroundwritten disclosure rmediate document	Z5 May 2023 T: theory or princi E: earlier patent d after the filing d D: document cited L: document cited &: member of the document	ple underlying the ocument, but publi late I in the application for other reasons	shed on, or



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	CLAIMS INCURRING FEES				
	The present European patent application comprised at the time of filing claims for which payment was due.				
10	Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):				
15	No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.				
20	LACK OF UNITY OF INVENTION				
	The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:				
25					
	see sheet B				
30					
	All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.				
35	As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.				
40	Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:				
45	None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:				
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55	The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the				
	claims (Rule 164 (1) EPC).				



LACK OF UNITY OF INVENTION SHEET B

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely: 1. claims: 1-19 10 Display device with an improved robustness against noise. 2. claims: 20-37 15 Display device with a reduced tensile stress in a bending area. 20 25 30 35 40 45 50 55

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-05-2023

							25 05 2025
10	c	Patent document ited in search report		Publication date		Patent family member(s)	Publication date
	יט	S 2021104695	A1	08-04-2021		20190115548	14-10-2019
					US	2019305234	03-10-2019
15					US	2020152896	14-05-2020
15						2021104695	08-04-2021
	נט	s 2020381671	A1	03-12-2020		112017535	01-12-2020
						20200138529	10-12-2020
							03-12-2020
20	ָ ט	S 2019318689	A1	17-10-2019			22-10-2019
					US	2019318689	
		 s 2017294495	 Δ1				12-10-2017
25		5 201/234435		12 10 2017			12-10-2017
23							17 06 2020
	U.	5 2020183641	AI	11-06-2020		20200089527	17-06-2020 11-06-2020
30							
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40							
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30							
	459						
	FORM P0459						
55	FOR						

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